R•I•T	Title: SVG 88 Series Track
Semiconductor & Microsystems	
Fabrication Laboratory	**Revision**: **E** **Rev Date: 01/28/2008**

Approved by:

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   Process Engineer   Equipment Engineer

1   SCOPE

The purpose of this document is to detail the use of the Silicon Valley Group (SVG) 88 Series Track. All users are expected to have read and understood this document. It is not a substitute for in-person training on the system and is not sufficient to qualify a user on the system. Failure to follow guidelines in this document may result in loss of privileges.

2   REFERENCE DOCUMENTS

- o   Material Safety Data Sheet Fujifilm HPR-504 Photoresist
- o   Material Safety Data Sheet Hexamethyldisilazane (HMDS)
- o   Material Safety Data Sheet JT-Baker SMDT-750 LITH EBR
- o   Material Safety Data Sheet MF-CD-26 Developer
- o   SVG Operation System Overview Manual
- o   SVG Programming Manual
- o   SVG Coater Manual
- o   SVG Preventative Maintenance Manual
- o   SVG Training Manual

3   DEFINITIONS

n/a

4   TOOLS AND MATERIALS

4.1   General Description

4.1.1   The SVG Track is a 4" coat and develop wafer track. The coat line is closest to the operator and runs left to right. The develop line is furthest from the operator (nearest the wall) and runs left to right. The coat line contains 4 modules (HMDS prime oven, cool plate, spinner, oven) controlled by two controllers, the left-most controller and the middle controller. The left-most controller manages the first two modules (HMDS and spinner); the middle-controller manages the last two modules (spinner and oven). The develop line contains 2 modules (spinner, oven), both controlled by the right-most controller. See Fig 1.
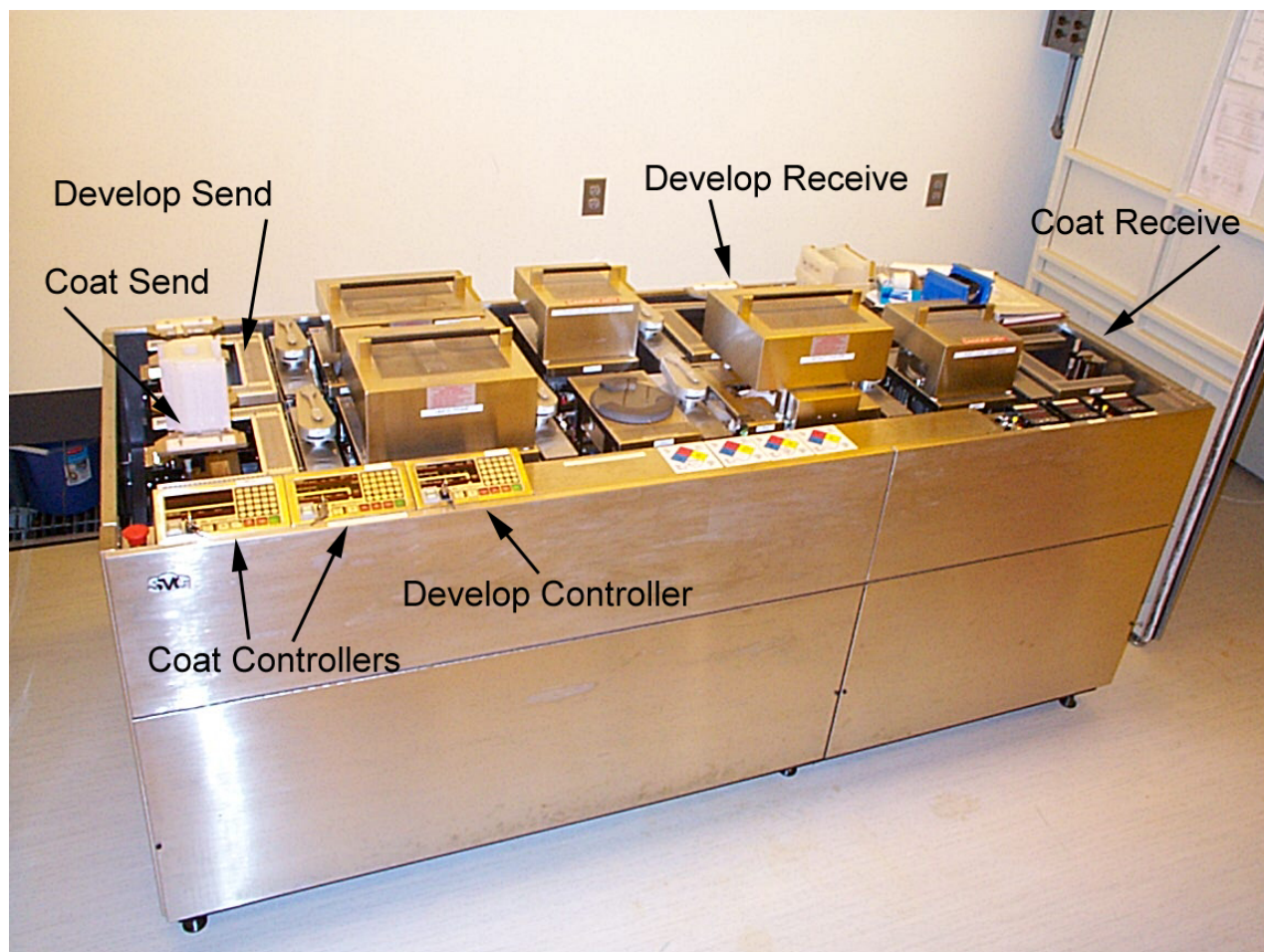
Fig. 1 SVG Track Features

4.2   **Wafer Boats**

4.2.1   The SVG Track can run with any 4" Orange or Black polypropylene cassette. It cannot run with metal or Teflon cassettes. The orange polypropylene cassettes are intended for use in the lithography operations (coat, expose, develop).

5   SAFETY PRECAUTIONS

5.1   **Hazards to the Operator**

5.1.1   The SVG track uses various organic solvents in the coat process and base solvents in the develop process. Operators should read material safety data sheets (MSDS) for these materials and be familiar with hazards and safety controls to prevent an accident before using the system. The materials are locally contained and exhausted adequately to prevent any personal harm from occurring. If organic solvents are smelled in the air during processing, an SMFL staff member should be contacted.

5.1.2   In the event of an emergency push the red **EMO** button on the far left of the machine.

5.1.3   During spinning operations, wafers rotate at high speeds. Spinner modules are properly covered and interlocked to prevent any accident from occurring. Do not attempt to defeat any interlocks and keep extremities away from spinner while in operation.

5.1.4   Always wear safety glasses.

5.2   Hazards to the Tool

5.2.1   The robotic arms on the SVG Track may be damaged if they are re-positioned manually. If the tool "hangs up," do not attempt to re-position the arms. Contact a staff member in case of an arm error.

5.2.2   Back side coating of wafers: If wafers are run through the track with resist on the backs, the hotplates will become contaminated.

5.2.3   Use only Fujifilm HPR-504 Photoresist and CD-26 Developer on this tool. Any other chemicals need SMFL approval.

6   INSTRUCTIONS

6.1   Initial State Check

6.1.1   Swipe in on the card swipe system.

6.1.2   If the track has not been run recently the photoresist dispense nozzle should be cleaned before processing any wafers. If it is uncertain whether the track has been run recently, assume it has not.

6.1.3   If the track has been run recently, verify the line to be used is in the correct stand-by state. In the stand-by state, there should be no cassettes on the line to be used and the elevators should be indexed all the way to the top.

6.1.4   If there are cassettes present and the elevators are indexed all the way to the top, the cassettes may be removed.

6.1.5   If cassettes are present and the elevators are *not* indexed to the top, press **INDEX RESET** on the appropriate controller. A single click of **INDEX RESET** will bring up the send cassette and a double click will bring up the receive cassette. After the elevator indexes to the top, remove the cassette and continue to Sec. 6.3. If the elevator does not index to the top, the system needs to be reset. Continue to Sec. 6.2.
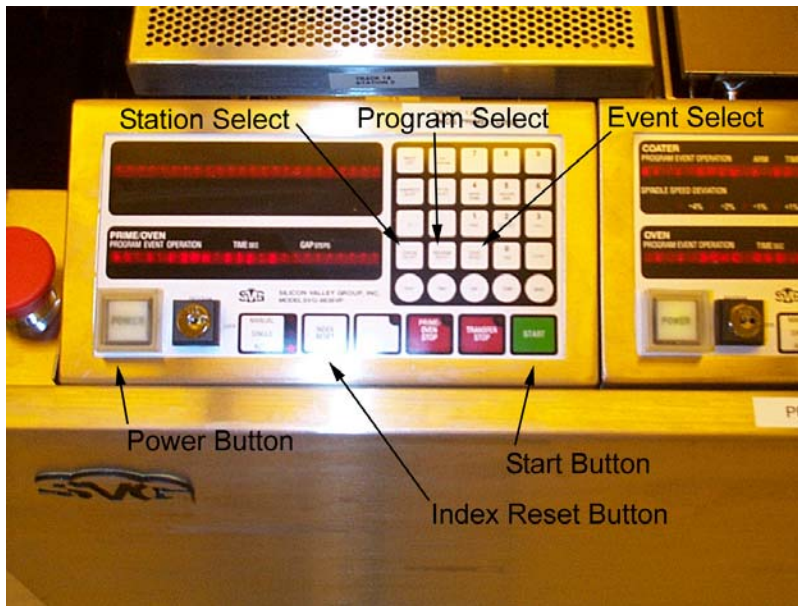
Fig 2 SVG Controller Buttons

6.2   Resetting the System

6.2.1   Remove any wafers that are still present in the line.
6.2.2   Turn the power off by pressing the **POWER** button on all controllers for the line to be used.
6.2.3   Wait 10 seconds and turn the power on from right to left by pressing the **POWER** buttons.
6.2.4   One or more alarms may sound. To silence an alarm press **CLEAR** on the controller which is alarming, as indicated by the flashing orange light
6.2.5   The system will go through a brief start up sequence.
6.2.6   If you get a "System Error," repeat the reset sequence or contact a staff member.

6.3   Operating the system

6.3.1   To execute a line operation, four items must be completed: (1) The program to be used must be loaded (2) The cassettes need to be placed on the line (3) The line must be started (4) The cassettes must be unloaded correctly. In addition, cleaning the photoresist dispense nozzle may be necessary if the track has not been run recently.

6.3.2   **Loading a program**

6.3.2.1 The currently loaded program is displayed on the left hand-side of the controller display, under the PROGRAM heading. Each module can run different programs at the same time, i.e. because Program 1 is loaded in the HMDS prime, does not mean Program 1 is loaded in the spinner.

6.3.2.2 If the desired program is not currently loaded, press the **PROGRAM SELECT** button to cycle through the programs until the desired program is displayed.

6.3.2.3 To switch between the active modules on a controller (necessary on the Spinner/Oven Controller on the Coat line and the Spinner/Oven Controller on the develop line), press the **STATION SELECT** button. A cursor is displayed on the far left-hand side indicating the "active" module. Pressing the **STATION SELECT** button will cause the cursor to jump to the other module.

6.3.3   **Cleaning the Photoresist Dispense Nozzle**

6.3.3.1 Obtain an acetone squirt bottle from the solvent cabinet.

6.3.3.2 Squirt the end of the photoresist dispense nozzle with acetone

6.3.3.3 Load program 10, "DISP 1 PRIME-START?" in the coater controller and press **START**. This is loaded by pressing "**9**" and then **PROGRAM SELECT** <u>twice</u>**.**

6.3.3.4 The dispense arm will travel to the edge of the bowl and fire the photoresist dispense pump twice. The nozzle may be squirted with additional acetone and program 10 run if more cleaning is necessary.

6.3.3.5 Instead of using program 10 you may just run a couple of blank wafers with the normal coat program to clean out the nozzle.

6.3.3.5 Return the acetone squirt bottle to the cabinet.

6.3.4   **Loading the cassettes**

6.3.4.1 The SVG track is very sensitive to the correct sequence of cassette loading and unloading. If the exact sequence is not followed, the machine will error and wafers may be lost.

6.3.4.2 With no cassettes present on both elevators and the elevators indexed all the way to the top, set the receive cassette on the elevator. Ensure the cassette is set correctly.

6.3.4.3 With the receive cassette placed and the send elevator indexed to the top, set the send cassette on the elevator. Ensure the cassette is set correctly.

6.3.4.4 The cassettes are now set correctly and the line is ready to execute a program.

6.3.5   **Starting the line**

6.3.5.1 To start the line, press **START** on the far-left module. The line will begin to run wafers.

6.3.5.2 The controllers will display the current process step for a given module.

6.3.6   **Unloading Wafers**

6.3.6.1 When the line has finished processing all wafers, the receive elevator will not index to the top. Do not remove the cassette without the elevator at the top.

6.3.6.2 **Single click** the **INDEX RESET** button on the appropriate controller to move the **load** elevator to the top. **Double click** the **INDEX RESET** button on the appropriate controller to move the **receive** elevator to the top.

6.3.7   **Shutting down the line**

6.3.7.1 Swipe out on the card swipe system.

6.4   Errors during Run

6.4.1   Occasionally, the SVG Track will "hang up" during normal operation. Typically, this is caused by a warped of dirty wafer creating a vacuum error or by a bad cassette. You may fix the problem and then press the start button to continue processing. If you remove a bad wafer, press the WAFER LOST button and then press start to continue processing the remaining wafers. If the track will not restart, the system will need to be reset. See Sec. 6.2

6.4.2   Hang-ups are typically caused by warped of dirty wafers causing a vacuum error. Inspect the wafer and ensure it is clean and flat before re-processing.

6.4.3   If the track is alarming, but the controller alarm lights are not on, a chemical reserve problem must be solved. Contact an SMFL staff member.

6.4.4   If a more critical problem is suspected, contact an SMFL staff member.

7 <u>APPROPRIATE</u> <u>USES</u> <u>OF</u> <u>THE</u> <u>TOOL</u>

7.1 **Use only Fujifilm HPR-504 Photoresist and CD-26 Developer on this tool. Any other chemicals could clog the track and will need SMFL approval.**

7.2 **No back side coating of wafers. If wafers are run through the track with resist on the backs, the hotplates will become contaminated.**

8 <u>ATTACHMENTS</u>

8.1 **Coater Track Program List**

8.2 **Coater Track Programs**

8.3 **Develop Track Program List**

8.4 **Develop Track Programs**

8.5 **Option Settings**

8.6 **Process Notes**

REVISION RECORD

Summary of Changes	Originator	Rev/Date
Original Issue	Peterson	A - 01/28/2002
Update programs, include nozzle clean	Peterson	B - 03/20/2002
Update nozzle clean, unloading cassettes, error correction and attachments.	O'Brien	C - 11/13/2002
Update 4.2.1, 5, 6.1, 6.2, 6.3.7, add appropriate uses of tool section 7.	O'Brien	D – 08/18/2003
Updated for HPR-504 Resist, section 6.2 clarified reset procedure.	O'Brien	E – 01/28/2008